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the face of the great degradation of these peoples the English missionaries assert the language of the Yahgans contains no less than 30,000 words, "suggesting the hypothesis of an origin very different and far superior to their present state."

GEOLOGY AND PALÆONTOLOGY.

THE OLDEST TERTIARY MAMMALIA.—The lowest horizon of the Puerco epoch of New Mexico has recently been explored by David Baldwin with good results. The following is a list of the species of Mammalia obtained by him. The proportion of novelty, it will be seen, is large:

Polymastodon ? taoënsis Cope.

Polymastodon latimolis, sp. nov.—This marsupial equals the *P. taoënsis* in size, and is therefore larger than either the *P. fissidens* or the *P. foliatus*. It differs especially from both the *P. taoënsis* and the *P. foliatus* in the great shortness of the first true inferior molar, which is only one-half longer than the second or last true molar. The latter is as wide as long in the type, and a little narrower in a second specimen. It supports four tubercles on the inner side; outer side worn. The first true molar appears to have five tubercles on the inner side, although the anterior edge is injured. In *P. taoënsis* there are six or seven. The fourth premolar is two-rooted. The enamel of the last inferior molar is faintly longitudinally wrinkled. The coronoid process rises opposite the middle of the second true molar.

Measurements: Total length of molar series, M. .038; of second true molar .017; width of do. .011; length of crown of second true molar .014; width of do. .011. Depth of ramus at M. II .038; do. at diastema .024. Depth of ramus of a second individual .042. Besides the shortness of the second true molar, the width of the same tooth and of the last true molar distinguish this species from the *P. taoënsis*. The inflection of the angle of the ramus of the lower jaw is as well marked as in other species of the genus.

Chriacus hyattianus, sp. nov.—Represented by two maxillary bones with molar teeth, one of which is accompanied by a broken mandibular ramus, which supports the second true molar and parts of other teeth. The superior molars are quite peculiar, and are especially characterized by their small transverse as compared with their anteroposterior diameter. The crowns are surrounded by a cingulum, except on the inner side, where distinct traces of it are visible. The external cusps are small and low and flattened on the external side, and are connected at their bases by a low ridge. They send inwards each an angular ridge which unites with its fellow in an angular internal cusp of little elevation, enclosing a triangular fossa. Small angular intermediate tubercles exist at the internal bases of the external cusps. The posterior cingulum is a little better developed than the anterior, and rises into a very small cusp or tubercle, which is not of sufficient size to truncate the internal outline of the crown. The crown of the second true inferior molar displays a contracted triangle of three well developed cusps anteriorly, and a wide basin posteriorly. The rim of this basin is elevated all round and develops into a cusp on the external side. An external, no internal cingulum. Enamel longitudinally wrinkled.

Measurements: Length of three true molars .0185; diameters of M. II, anteroposterior .0075, transverse .0075; do. of second inferior true molar, anteroposterior .0075, transverse posteriorly .006. As the fourth inferior premolar of this species is unknown, its reference to the genera Chriacus is provisional only. It is dedicated to my friend, Professor Alpheus Hyatt, of Boston, Mass.

Mixodectes ? sp.—Two rami with true molars.

Loxolophus adapinus, gen. et sp. nov.—*Char. gen.*—Known only from inferior molars. Crowns with three cusps anteriorly and a basin posteriorly. The internal and external anterior so connected as to form a transverse crest on a little wear; anterior or fifth cusp distinct. Rim of basin elevated on the external side and extending as a crest to the base of the anterior cusps. Internal rim acute, and so near the external as to resemble a large cingulum. Third true molar with a small heel. The position of this genus cannot be determined without further material. The oblique direction of the crests resembles what is seen in the genus Adapis Cuv.

Char. specif.—The posterior rim only rises into a cusp at the posterior external angle. There are no cingula. The enamel is slightly wrinkled longitudinally. The posterior molar is considerably smaller than the first, which is a little smaller than the second. The last molar rises obliquely with the anterior base of the coronoid process. The anterior masseteric ridge is quite predominant, but the fossa is not distinctly bounded below.

Measurements; Length of true molars .019; of last molar .006; width of do. .003; length of second true molar .007; width of do. .0045

Sarcothraustes coryphæus, sp. nov.—Represented by a considerable part of a cranium, which supports the true molars of both sides, and the fourth premolar of one side. The absence of the mandible leaves the generic reference somewhat uncertain. The superior molars resemble those of the *Triïsodon canidens* M., and those of the *Sarcothraustes antiquus* M. As these genera have been kept apart on account of differences in the superior dentition, and as only the true inferior molars of the former are known, and probably only the inferior premolars of the latter, both may belong to the same genus, *i. e.*, Sarcothraustes. The present species is smaller than either of the above-named, and differs in various points in the superior molars.

The crowns of the superior molars support two external conical cusps which stand close together, but are entirely distinct, and have a circular section. There is a single internal conical cusp flattened on the external side. The entire crown is surrounded by a well developed cingulum, which is especially prominent round the external anterior cusp of the second and third true molars. The posterior external cusp of the last true molar is rudimental, and is situated well within the external line on the posterior border. The fourth premolar has a single external cusp, and the cingulum is wanting on the anterior and interior sides. The outline of the base of the crown of this tooth is subtriangular; that of the first and second true molars is a half ellipse; while that of the last true molar is a transverse oval as in the two species mentioned above. In this last respect it differs from the species of Mesonyx and Dissacus, where that tooth has a triangular base. Enamel delicately wrinkled where unworn. In the two species of Sarcothraustes already mentioned the first and second true molars have a triangular outline, and there is no internal cingulum.

The occiput of this species rises into an elevated transverse crest with an oval outline, like that of the Dinocerata. This is divided in front by an elevated sagittal crest. The brain cavity is very small. There is a preglenoid crest.

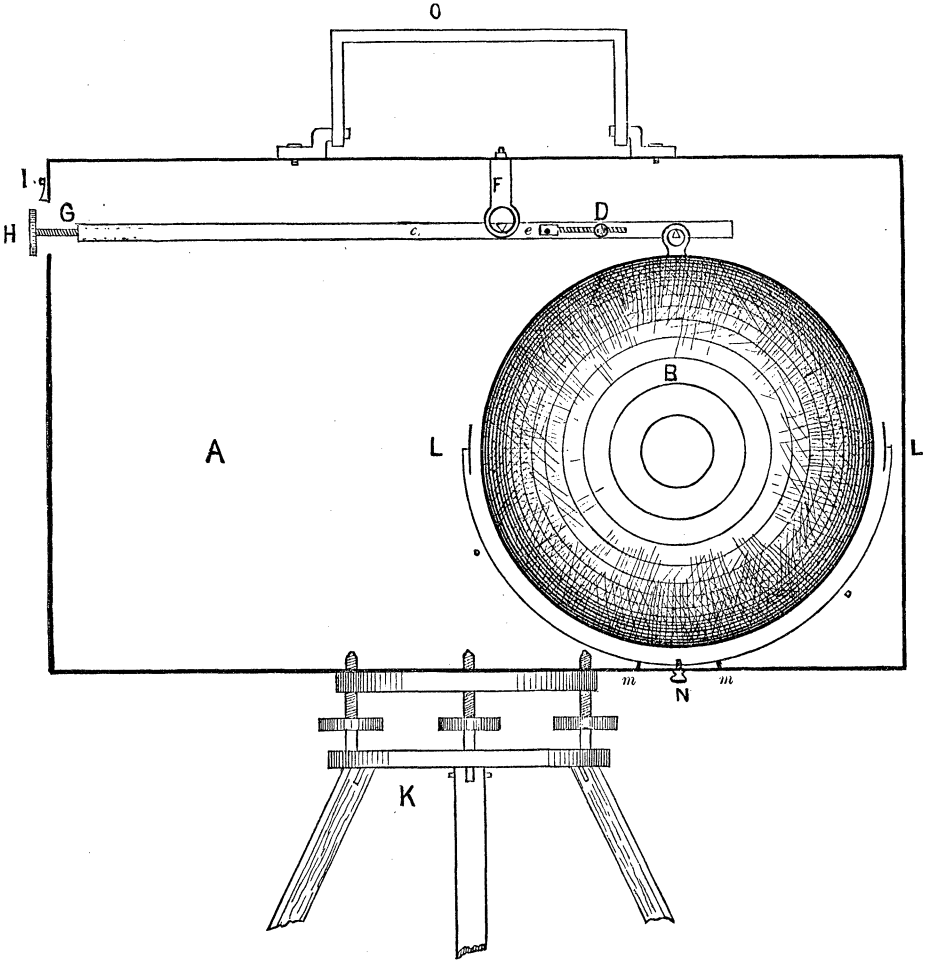
Measurements: Length of true molars .031; diameters of Pm. IV, anteroposterior .010, transverse .012; do. of M. II, anteroposterior .011, transverse .016; do. of M. III, anteroposterior .008, transverse .015; elevation of occipital crest .058.

Phenacodus puercensis Cope.

Periptychus coarctatus Cope.

A Barometer for measuring separately the Weight and Pressure of the Air.—The present mercurial barometer at all times measures, not alone the weight or pressure of the air, but both weight and pressure. It cannot measure either separately, that is, we cannot *know* when either pressure or weight alone has affected it. It is the purpose of this article to suggest a barometer that will measure alone the weight of the air and not be at all influenced by pressure, temperature, moisture or the sun's or moon's attraction. The central idea of this plan is not new, but the special construction to accomplish the end sought, I think, is.

Take a hollow glass sphere (*B*, as shown in the figure) and exhaust the air (by means of mercury or otherwise). Suspend it from one end of a balance beam, *c*. Put the whole in a glass walled box, *A*. Such box may be mounted on a tripod, *K*, with leveling screws. Into the opposite end of the balance beam, *c* (from the sphere) is inserted a screw, *G*, with threads measuring one hundredth of an inch, with a large circular head, *H*, graduated into divisions of one-tenth of its outside circumference, which in connection with a vernier, *I*, will read to tenths of these or one hundredth of the circumference, or, as a whole, to one ten-thousandth of an inch. *H*, or the head of the screw, extends through a hole in the glass box, so as to be turned by hand. To the right of the fulcrum, *F*, is a screw, *e*, on which a ball, *D*, works, and is for the purpose of adjusting the balance at mean



sea-level. When this is done the screw, *G*, is run in or out as the case may be to measure the increase or decrease of the weight of air. The screw, *G*, might be made to carry a vernier along the balance bar, *c*, to register the number of turns of the screw, but such is not shown in this sketch. *O* is a handle for carrying the box by hand. *m m* are fulcrums on which a spring bow, *o o*, rests.

On the ends of this bow are two clamps, *L L*, for holding and steadying the sphere, *B*, when being moved or carried from place to place. The clamp screw, *N*, is turned so as to draw downward the bow, *o o*, between the fulcrums, *m m*, which causes the upper ends of the bow to clamp the sphere. Four clamps may be used.

I think it will be plain to any one that the *presence* of the air, or the attraction of the earth, sun or moon will be equally exerted on the sphere, *B*, and the balancing weight (screw *G*). Also, that the difference in the weight of the sphere, *B*, before the air is exhausted and afterward, is the weight of the air exhausted. Also, that the difference in the turn of the screw, *G*, from its position at sea-level, and any tried elevation above, to balance the sphere, is the comparative weight of the air at the two places.

If experience should prove that the accumulation of dust and moisture on the sphere, *B*, will materially affect the weight thereof, it can be obviated by balancing the sphere, *B*, with another of the same surface and weight (exhausted air excepted), which can be moved to the right or left on the left end of the balance beam, *c*, by means of a screw similar to *G*, and have the number of turns recorded by a vernier on the balance beam.

I have seen the mercurial barometer affected by the sudden opening or closing of a door in a tight room where the barometer was hung. I think I was not mistaken when I thought I saw it vibrate with the sudden dashing March winds which are strong enough sometimes to stagger a man as he walks. The plan I suggest will not be affected by these conditions if kept out of the wind current. It will be interesting to compare its action with the mercurial barometer anyway.—*Jno. T. Campbell, Rockville, Ind., Jan. 24, 1885.*

THE ERIBOLL CRYSTALLINE ROCKS. — *Nature* contains two lengthy articles upon the crystalline rocks of the Scottish highlands, the one from the pen of Archibald Geikie, the other a report by B. N. Peach and John Horne. It appears a fresh element of difficulty has been introduced into the geology of the Highlands. The crystalline schists which in Northwest Sutherland overlie fossiliferous Silurian strata, and which were believed by Murchison to be newer than those strata, are actually older, and overlie the newer rocks by virtue of reversed faults accompanied by "thrust-planes" or horizontal pushings forward of the rocks on the up-throw side. The coast sections of Loch Eriboll show these dislocations clearly. Beginning with gentle foldings they increase until the order of the strata is reversed. In Durness, for example, the overlying schists have been thrust over westwards across all the other rocks for at least ten miles. Some of the overlying bands are Archæan gneiss, others Silurian quartzite, and in one case a mass of the Upper

Durness limestone can be detected. The crystallization increases, however, so much that it becomes impossible to determine the original character of the rock by examination in the field. From the remarkably constant relation between the dip of the Silurian strata and the inclination of their reversed faults, Professor Geikie concludes that these dislocations took place before the strata had been seriously disturbed.

THE THEATER OF THE EARTHQUAKES IN SPAIN.—M. Hébert recently presented to the French Academy of Sciences a communication upon the earthquakes in the south of Spain—cataclysms more violent than any which have visited Spain in historic times. If the details furnished by the papers are examined, it will be evident that the localities recently disturbed by earthquakes are almost all situated on two zones, the one to the south of the Jurassic and Cretaceous mass which bounds the provinces of Malaga and Granada, the other to the north of it. In the southern zone the most severely visited localities were Antequera, Malaga, Velez, Torros, Alhama, Granada, etc.; while the northern zone comprehends Cadiz, Xerez, Seville, Cordova, Linares, etc., and Valencia, all towns where shocks have been felt. The rest of the peninsula does not seem to have suffered much from this instability of the Mediterranean regions, except Albuquerque in the parallel of Lisbon, destroyed Dec. 26th and 27th, and some slight shocks in Galicia. M. Hébert called attention to the Balearic isles, which are situated between the two zones, are elevated eighty meters or more above the sea-level, and are composed at the surface of horizontal beds of Quaternary age. These islands have therefore been raised more than a hundred meters since the Quaternary epoch, and this elevation has been limited northward and southward by fractures in the line of prolongation of the defined zones of dislocation above. Thus it is clear that the cause of dislocations in these regions is always present and always active.

GEOLOGICAL NOTES.—*General.*—A letter from Capt. C. E. Dutton upon the basalt fields of New Mexico, has been contributed to *Nature.* The center of activity is Mount Taylor, otherwise the San Mateo mountains, a volcanic pile 11,380 feet high, carved into numerous spurs by magnificent gorges. It was originally built by outbreaks both from its flanks and summit. From this center the lavas reach out for forty-five miles to the north-northeast, and in other directions for from eighteen to thirty miles. Beyond the immediate base of the mountain the lava forms a superficial sheet over each mesa or table, varying in thickness from fifty to two hundred feet. Erosion has cut through the lava and the underlying sedimentary strata, leaving mesas sometimes separated two or three miles from the parent mass. Many of the vents scattered around the flanks of Mount Taylor can be easily identified. The "necks" or "chimneys" which are left standing in the valley plains beyond the farthest verge of the lava-capped mesas form one of the most striking features of the country. One is nearly two thousand feet high. In the wide valley-plains between the mesas are newer fields of lava, some so fresh that one might think them scarcely a century old, and it is clear that they were erupted after many a square mile of strata overflowed by the older basalts had been eroded away. No vents are found in connection with these younger eruptions, nor have any scoriæ been discovered. Some of them seem to have flowed from small depressed cones at their upper ends. One stream is sixty miles long. The ejecta found in connection with the older basalts are in relatively small quantity. Cliffs, mesas, terraces, carved buttes and gorgeous colors are as characteristic of the New Mexico plateau region as of that of Utah, and the Cretaceous system is better preserved. The younger basalt is much like the rougher lava of Mauna Loa.——As a conclusion of his studies upon the origin of phosphates of lime in sedimentary formations M. Dieulafait announces that the waters which have excavated the calcareous rocks of the north-west of France, and formed the phosphorites, are *exterior* waters circulating from above downwards. It thus follows that, contrary to current ideas, deposits similar to those of which the phosphorites form part, wherever found, and whatever their importance, do not owe their origin to internal but to external causes.

Silurian.—A fossil scorpion has recently been found by M. Lindstrom in the Upper Silurian of the Island of Gothland (Sweden). The surface is so well preserved that the chitinous cuticle, compressed and wrinkled by the superincumbent beds, can be made out. The cephalothorax, abdomen with its seven dorsal plates, and tail of six segments ending in the poison-bearing sting, can be well distinguished. One of the stigmata can also be seen. M. Lindstrom has named this oldest of known land animals *Palæophones nuncius.* The four pairs of thoracic feet in this scorpion are like those of the embryos of many other Tracheata and resemble those of Campodea. The same appendages in the Carboniferous scorpions are like those of existing species.

Cenomanian.—The Elobi islands, upon the west coast of Africa and in the first degree of north latitude, are formed of horizontal beds of sandstone, poor in fossils. One of the species met with, *Schlönbachia inflata*, characterizes the Lower Cenomanian of Europe, and is particularly abundant in the French departments of Yonne and Aube. These beds, according to M. Ladislos Szajnocka, are continued along the Gaboon coast to the islands of Muni and Mounda, and appear also to stretch along the west coast of Africa along the Sierra da Crista and the Sierra Camplida to Mossamedes and Benguela.